

## A REVISION OF THE SUB-FAMILY RHINIINAE IN THE ORIENTAL REGION.

By RONALD SENIOR-WHITE, F.E.S., F.R.S.T.M. & H.,  
*Malariaiologist, The Kepiigalla Rubber Estates, Ltd.*

(Plates V, VI.)

The present paper forms part III of a general revision of the old family Muscidae in the Oriental Region by Major W. S. Patton and the present writer. The two parts which have already appeared (Senior-White, 1924a, and Patton & Senior-White, 1924) have covered groups of great economic interest and medical importance, and whilst the same claim can be made for the major portion of the remaining sub-families, that which forms the subject of the present paper, though of much biological interest, has apparently little or no economic status. None the less, a systematic revision, even, as in the present case, with an ultimate medical object, cannot omit the study of any part of a group. In its course it is necessary to cover the present sub-family, just as any revision of the Culicidae must include the Chaoborinae.

The Rhiniinae form a rather homogeneous group, very distinct in general facies from the remainder of the Muscoid Tachinids by reason of the strongly projecting face, whilst in adult habit they are essentially flower flies, and, with few exceptions, are never found in houses or frequenting food or offal. Taxonomically, they are well distinguished as a group by the presence on the upper side of the wing of a row of bristles on the radial sector, by the vibrissae always high above the epistomal margin, the apically clavate palpi, the sterno-pleural bristles arranged 1 : 1, and in the male sex, by the sternites, after the apparent first, being covered by the over-lapping margins of the tergites. This narrowing of the sternites is characteristic of many true Tachinids, none the less, the sub-family probably leads on from the Calliphorines by way of *Anastellorhina* and *Pollenia*, but such questions of phylogeny are outside the scope of the present paper.

The history of the systematics of the Oriental species follows very closely that of the Sarcophaginae of the same area, as described by the writer in his paper 1924a. There is a 'first period' commencing with Fabricius in 1794 and ending with Bigot in 1887, during which the tale of the species mounted steadily, but, owing to the much more distinctive external characters the Rhiniinae possess, without leading to such ultimate confusion. Then, just as in Sarcophaginae, there came a pause, in this case of thirty years, only broken by one or two odd fresh descriptions, at the end of which the 'second period' starts with the first revision of the sub-family by Townsend (1917), on whose paper all modern knowledge of the sub-family is based.

The material with which Townsend worked was sent him from the Zoological Survey, and he carried out his researches in America, far from the resting places of the types of the 'first period.' He, therefore, described as new all such species as he could not recognize from

the published descriptions, which, of course, at once ruled out the whole of Walker's numerous describings, but thanks to the varying facies of the species, he was able to recognize with certainty many of the older species. Townsend's paper was followed by two by the present writer (Senior-White 1922 and 1923), in which the collections of the Agricultural Research Institute at Pusa and several smaller collections were worked out, and a good many new species described. None the less, in the second of these papers the writer sounded the warning that when type examination became possible many of the new species of the 'second period' would fall to old names. The results of such type examination, with a few additional new species of certain validity, are recorded in Senior-White 1924b. As a result of that paper it is hoped that the nomenclature and enumeration of the species in the Region have reached approximate finality, but, since the results of the work of the second period are scattered through four papers, it is necessary that there should be a final revision to collate them and render the determination of species convenient for the general worker. On the other hand, as these papers are all easily accessible and in one language, it is not considered necessary that descriptions appearing in them should be re-quoted in full in the present revision. Only species of which the description is inaccessible or poor are re-described here. The reference or references given under the remaining species are to good descriptions or figures. But, in the majority of cases, most of the noticeable specific characters have been made use of in preparing the specific keys.

The location of a species in the present sub-family can be accomplished with the aid of the composite table on page 219 of my paper 1924a. The subjoined key, which is based on Townsend's of 1917, should enable any species to be correctly located generically. It will be noticed that it commences with the opposite end of the sub-family to Townsend; the reason for this is phylogenetic only.

Comparison of the two keys shows that many of the Townsendian genera have disappeared. My reasons for sinking these in older genera will be found in each case under the genera affected.

#### KEY TO THE ORIENTAL GENERA OF RHINIINAE.

|  |  |
|--|--|
| 1. Epistome projected downward rather than forward           | 2  |
| Epistome projected strongly forward                          | 10   |
| 2. Arista plumose or long pubescent, ciliate above and below | 3  |
| Arista bare or at most microscopically pubescent             | 8  |
| 3. Anal segment with discals, at least laterally             | 4  |
| No discals on anal segment                                   | 7  |
| 4. Arista plumose practically to tip                         | 5  |
| Arista pubescent about two-thirds length only                | <i>Metalliopsis</i> Tnsd.                        |
| 5. Species non-metallic, grey or brown in colour             | 6  |
| Species metallic, green or blue                              | <i>Strongyloneura</i> Big.                       |
| 6. Palpi not apically widened                                | ..   |
| Palpi apically widened                                       | <i>Idiopsis</i> B. & B.<br><i>Pollenia</i> R.-D. |
| 7. Epistome very narrow, hypopygium of moderate size         | <i>Thoracites</i> B. & B.                        |
| Epistome normal, hypopygium enlarged in both sexes           | <i>Chloroidia</i> Tnsd.                          |

|   |                            |
|---|----------------------------|
| 8. Facial carina quite absent                             | 9                          |
| Facial carina weak but distinct                           | <i>Metallea</i> Wulp.      |
| 9. Apical cell closed or very narrowly open               |                            |
| Apical cell widely open                                   | <i>Rhynchomyia</i> R.-D.   |
| 10. Arista plumose, ciliate above and below               | 11                         |
| Arista ciliate on upper edge only <sup>1</sup>            | 13                         |
| 11. Disc of mesoscutum with macrochaetae                  | 12                         |
| Disc of mesoscutum without macrochaetae                   | <i>Borbororhinia</i> Tnsd. |
| 12. Anal segment with median discals ..                   |                            |
| Anal segment without median discals                       | <i>Cosmina</i> R.-D.       |
| 13. Male genitalia prominent, enlarged ..                 | 14                         |
| Male genitalia normally small and inconspicuous.          | 15                         |
| 14. Apical cell petiolate .. ..                           | <i>Chlororhinia</i> Tnsd.  |
| Apical cell open  | <i>Idiella</i> B. & B.     |
| 15. Apical cell open or closed, in line with final course |                            |
| of vein IV  | <i>Stomorhina</i> Rond.    |
| Apical cell closed, almost in final course of vein        |                            |
| III ..  | <i>Rhinia</i> R.-D.        |

### **Idiopsis** Brauer & von Bergenstamm.

Epistome moderately forward produced. Facial carina wanting. Arista biplumose. Palpi narrow throughout, not apically widened. Apical cell open. Male sub-holoptic. Anal segment with irregular discals.

Owing to the shape of the palpi this genus is doubtfully included in the present sub-family—unless the only Oriental species, from which this character is drawn, is wrongly located generically. Townsend is doubtful as to the shape of the palpi in the genotype.

#### **Idiopsis argenticincta** Senior-White.

A small dark species, at once recognizable by the transverse band of silvery pollen across the middle of the thorax, starting from the sternopleuron on each side. For detailed description see Senior-White 1923, page 48.

Simla ; Muktesar (Kumaon Himalaya).

#### **Pollenia** Robineau-Desvoidy.

Epistome produced forwards,—narrowed. Facial carina present or absent. Arista biplumose. Apical cell open or closed. Male sub-holoptic. Anal segment with irregular discals.

In this genus I would sink *Nitellia* R.-D., as has been done by many previous authors as summarized in Kertesz (1907), and also the two Townsend genera *Dexopollenia* and *Polleniopsis*, which differ from *Pollenia* as restricted by Townsend only in the shape of the facial carina, and between themselves only in some chaetotactic characters of very minor value.

#### KEY TO THE ORIENTAL SPECIES OF *POLLENIA*.

1. Larger species, fourth vein angled and concave beyond, much as in *Sarcophaga* .. ..
2. Smaller species, fourth vein practically straight beyond the bend
- 4.

<sup>1</sup> Except in *Stomorhina biplumosa* S.-W.

|   |       |                            |
|---|-------|----------------------------|
| 2. No yellow at wing base .. ..   | .. .. | 3                          |
| Base of wing strongly yellow infuscated .. ..   |       | <i>pilosa</i> Tnsd.        |
| 3. Anterior end-piece of aedoeagus forked, posterior long, thin spine .. ..                 |       | <i>rudis</i> Fab.          |
| Anterior end-piece of aedoeagus unbranched, posterior short, broader, half its length .. .. |       | <i>indica</i> S.-W.        |
| 4. Lateral discals present on all abdominal segments .. ..                                  |       | 5                          |
| Lateral discals on apical segment only .. ..  |       | 6                          |
| 5. Brown species, thorax with yellow pile .. ..   |       | <i>testacea</i> Tnsd.      |
| Grey species, thorax with thick golden wooly pile .. ..                                     |       | <i>hazarae</i> S.-W.       |
| 6. Antennae barely one-third height of eye, short .. ..                                     |       | <i>khasiensis</i> S.-W.    |
| Antennae half height of eye, long .. ..   |       | <i>pilosquama</i> sp. nov. |

### Pollenia pilosquama, sp. nov.

Female. *Head*: frontal stripe black, parafrontals ashy, with dull black patches around bases of bristles. Two proclinate fronto-orbitals. Face and cheeks ashy grey, a dark patch at junction of two latter. Epistome not very strongly produced, but vibrissae well above mouth border. Facial carina low but very sharp. Antennae black, half the height of an eye, the third joint 4-5 times the length of the second and arising higher on head than in *khasiensis*. Palpi yellow-brown apically, and lightly clavate. *Thorax* dark grey with indefinite black stripes. Pleurae similar but rather darker. Acrostichals and dorso-centrals both 2:3, sternopleurals 2 : 1. Abdomen black and grey tessellate, very like a *Musca*. Marginals on apparent third and fourth segments very strong, lateral discals on fourth weak. *Legs* black, tarsi very spinulose. *Wings* with costal and sub-costal cells yellowish, otherwise clear. Costal spine double and very strong. Fourth vein straight beyond the bend, and closing first posterior cell in margin. *Squamae* with small patch of hairs as in *M. inferior*. Long 4½ mm.

The whole appearance is very like a *Musca*, but the species is undoubtedly closely allied, though well distinct from *Pollenia khasiensis*. Described from a unique female, taken on window, Suduganga, Matale Dist., Ceylon ; 15. viii. 24. In my own collection.

### Pollenia khasiensis Senior-White.

A small dark grey species not possessing any noticeable characters for recognition. The sternopleurals are formed 2 : 1, but I think the species is correctly located here. For detailed description see Senior-White 1923, page 49. Only known from Shillong.

### Pollenia rudis Fabricius.

*Musca obscura* Fab. *Musca depressa* Meig. *Musca varia* Meig.

Male, female. *Head*: epistome forward produced, the opening narrowed, its margin yellowish. Arista biplumose. Palpi black or yellow. Genae grey, brownish anteriorly. A black fleck at junction of parafrons and parafacials, and another, large and greyish, on latter below. ♂ Sub-holoptic, ♀ frons exceeding an eye-width, with one reclinate and two proclinate exterior frontals. *Thorax* dark greyish, with sparse hair of silvery-gold, the macrochaetae black. Sternopleu-

rals normally 1 : 1, but a weak extra one is sometimes developed anteriorly. *Abdomen* grey and black tessellate. Strong median discals on apparent fourth segment. *Legs* black. *Wings* slightly smoky. Long 8-9 mm.

This Palearctic species only enters the Oriental Region in Kashmir. It is the only species of which the life-history is known, being parasitic on earthworms, as discovered by Keilin.

### **Pollenia indica** Senior-White.

Very closely allied to *rudis*, but more elongate. For description see Senior-White 1923, page 51, and plate iv, figs. 7 & 8 of the same paper, where the genitalia are figured compared with those of the preceding species. Only known from the Kumaon Himalaya.

### **Pollenia pilosa** Townsend.

A large grey species, noticeable for the orange coloration about the base of the wing. For detailed description see Townsend 1917, page 202. An Eastern Himalayan species, recorded by myself with some doubt from the Khasia Hills.

### **Pollenia hazarae** Senior-White.

At once noticeable by the thick dull golden wooly pile enveloping the thorax. For detailed description see Senior-White, 1923, page 51.

Only known from the Western Himalaya (Abbottabad).

### **Pollenia testacea** Townsend.

A reddish brown species, with some yellow pile on the thorax. For detailed description see Townsend 1917, page 201.

Only known from the foothills of the Eastern Himalaya.

This genus in the Oriental Region is obviously an intruder from the Palearctic,—being confined to the Himalaya, except for two species on the Khasia Hills in Assam, and one species in Ceylon, where the fauna is well known to have Himalayan affinities.

### **Strongyloneura** Bigot.

Epistome produced forward. Arista oiplumose. Palpi apically spatulate. Facial carina present or absent, the latter in *Strongyloneura sens. strict.*, but there are traces of one in *S. coeruleana*, leading on to its strong development in species formerly placed in *Thelychaeta*, but as there is an intermediate condition for the feature, the latter genus is hereby sunk. The course of the fourth vein may be evenly rounded or sharply angled,—and is not quite constant, even within the species, but the apical (first posterior) cell always ends more or less bottle-necked, as in *Pyrellia*. The character of the course of the fourth vein being quite illusory, I also sink here *Synamphoneuropsis* Tnsd. The male is sub-holoptic. Anal segment with discals.

KEY TO THE ORIENTAL SPECIES OF *STRONGYLONEURA*.

|  |                          |
|--|--------------------------|
| 1. Facial carina weak or absent                  | 2                        |
| Facial carina strong, widely separating antennae | 8                        |
| 2. Wings unmarked, species more or less green    | 3                        |
| Wings apically infuscated, blue species          | <i>apicipennis</i> S.-W. |
| 3. Antennae yellow to brown                      | 4                        |
| Antennae black                                   | <i>nigricornis</i> S.-W. |
| 4. Facialia unmarked                             | 5                        |
| Facialia with brown fleck near middle            | <i>viridis</i> Tnsd.     |
| 5. Parafacialia golden to brown                  | 6                        |
| Parafacialia grey                                | <i>coerulana</i> Tnsd.   |
| 6. Green species ..                              | 7                        |
| Purplish, or with much white pile                | <i>nebulosa</i> Tnsd.    |
| 7. Facial hairs yellow ..                        | <i>nepalana</i> Tnsd.    |
| Facial hairs black                               | <i>viridana</i> Tnsd.    |
| 8. Wings unmarked, or nearly so                  | 9                        |
| Wings with apical half infuscated                | <i>dotata</i> Wlk.       |
| 9. Parafacialia yellowish                        | <i>viridaurea</i> Wd.    |
| Parafacialia dark grey                           | <i>chalybea</i> B. & B.  |

***Strongyloneura apicipennis* Senior-White.**

A dark blue species, with apical half of wings infuscated. For detailed description see Senior-White 1924b, page 116.

Only known from the Philippine Islands.

***Strongyloneura coerulana* Townsend.**

For detailed description see Townsend 1917, page 198. The genitalia are figured in Senior-White 1923, plate iv, fig. 2.

Known from South India, Ceylon, Andaman Islands and Malaya.

***Strongyloneura nebulosa* Townsend.**

For detailed description see Townsend 1917, page 197. The genitalia are figured in Senior-White 1923, plate ii, fig. 3.

Widely distributed in India.

***Strongyloneura nepalana* Townsend.**

For detailed description see Townsend 1917, page 196. The genitalia are figured in Senior-White 1923, plate ii, fig. 1.

Widely distributed in India.

***Strongyloneura nigricornis* Senior-White.**

A smaller species, at once distinguished from the other green species of the genus by the black antennae. For detailed description see Senior-White 1924b, page 115.

Only known from Cherat, N.-W.F.P., India, and Buru Island, Dutch East Indies. The first locality is on the Palearctic boundary of the region, the second beyond it, in the Austro-Malayan.

***Strongyloneura viridana* Townsend.**

For detailed description see Townsend 1917, page 197. The genitalia are figured in Senior-White 1923, plate ii, fig. 2.

Widely distributed in India.

**Strongyloneura viridis** Townsend.

For detailed description see Townsend 1917, page 199.

Not recorded south of the Indo-Gangetic Plain.

**Strongyloneura chalybea** Brauer & von Bergenstamm.

? *Somomyia infumata* Big.

Very much as in *viridaurea* Wied., but with parafacials dark grey. Pleural hairs are black, and there is no bunch of small black bristles in upper anterior angle of mesopleuron. The ground colour of the body is a more sombre green, with segments one to three more broadly black banded, the median stripe fine and obscure. No tessellate pattern. Femora and tarsi black. Tibiae dark brown. Wings very lightly darkened along the costal margin. Long 16 mm.

Recorded from Borneo, Burma and South India.

**Strongyloneura viridaurea** Wiedemann.

*Somomyia caeruleocincta* Big. *Musca munda* Wd. *Pyrellia sivah* Big. *Somomyia versicolor* Big.

Male, female. *Head* : ♂ frons reduced to a line, parafrons narrowly present. ♀ frons three-fifths an eye-width, the parafrons dull ashy yellow. Antennae dark brownish yellow, third joint grey pollinose, widely separated by the short, tubercular carina. The parafrontal bristles run down to the parafacials, in two rows, black. Face dull yellowish brown. Genae as facials. Palpi yellow, apically spatulate. *Chaetotaxy* ; Acrostichals 1 : 2 ; dorso-centrals 2 : 4. Pleurae with long soft sparse golden hairs. Upper angle of mesopleuron with a bunch of small black bristles. *Thorax* golden green, with very little white pile. *Abdomen* with some tessellation of white pile. Segments I to III black banded posteriorly. A median stripe on II to IV, broad only on II. *Legs* : femora metallic, tibiae brown with broad black tips, tarsi black. *Wings* : costal margin a little yellowish, there may be some infuscation preapically. Vein III bristly on the node and a little beyond on both sides. Long 11-15 mm.

Recorded from Ceylon, the Eastern side of India, the Himalaya, Burma, Malaya, Java and the Philippines.

**Strongyloneura dotata** Walker.

I am indebted to Major Austen for the following re description of the type.

"Type ♂.—Length 8·4 mm., width of head just over 3 mm., length of wing 8·2 mm.

Dorsum of body metallic bronze-green; first abdominal segment bronze-black, its hind margin, except in middle, narrowly bronze-green; second and two following abdominal tergites with a not very narrow continuous, median, black longitudinal stripe, second and third tergites also each with a bronze-black transverse band, in contact with anterior margin in middle but tapering off towards hind border at each lateral extremity, so that anterior angles of each tergite are broadly metallic bronze-green, second tergite also with its extreme hind margin bronze-

green; bronze-green lateral extremities of second and two following tergites thinly clothed with pale neutral grey pollen; fifth tergite bronze-green, its extreme tip black-bronze.

*Head*: eyes narrowly separated in middle of frons by olive-buff frontal margins; occiput black or olivaceous black, posterior orbits pale smoke-grey pollinose; jowls light neutral grey, facial angles orange-cinnamon, clypeus greyish cinnamon-buff; facial carina present but not very conspicuous, descending to level of middle of third antennal segment, then spreading out. Palpi cinnamon buff slightly spatulate at tips; antennae cinnamon-coloured, terminal segment somewhat brownish, arista dark brown, long and slender and feathered with long hairs above and below.

*Abdomen*: fourth and fifth tergites with median as well as lateral discal macrochaetae.

*Wings*: rather more than distal halves, from just beyond anterior transverse vein to tips, infuscated, darkest portion of this area resting on costa, from a little beyond end of first longitudinal to end of second longitudinal vein, and terminating in tip of discal cell, in which it occupies rather more than one-third of total area."

Not seen since its original description from Singapore.

### ***Chloroidia* Townsend.**

Epistome forward directed. Facial carina absent. Arista biplumose. Male sub-holooptic. Macrochaetae bristle-like, on margins of last two segments. Intermediate abdominal segments of male extremely shortened, the two genital segments greatly enlarged and almost as long as the four preceding segments. Fifth sternite of male with a spine brush, sixth sternite excessively broadened and with spine-brushes on each side. Female hypopygium large and broad. Apical cell of wing very narrowly open, almost closed.

### ***Chloroidia prolata* Walker.**

*Chloroidia flavigrons* Tnsd.

Plate V, figs. 1—4, 14.

The most beautiful of the Indian Muscids. At once recognizable by the yellow head, bright, non-shining green thorax, and shining purple abdomen. For full description see Townsend 1917, page 196. The minute aedeagus, in comparison with the enormous ixth tergite, is very notable. The structure of the proboscis shows that the species is predaceous.

Occurs in South India, Ceylon, Assam, Burma and Celebes.

### ***Thoracites* Brauer and von Bergenstamm.**

Epistome forward produced, very narrow. No facial carina. Arista biplumose to tip. Male eyes as far apart as length of second antennal joint. Macrochaetae marginal on sides of first abdominal segment, discal and marginal on sides of second and third, strong on margins of last segment. Female frons narrower than usual, with one reclinate and two proclinate frontals. Strong marginal spines in female. Apical cell narrowly open.

### **Thoracites abdominalis** Fabricius.

*Rhynchomyia plumata* Schin. *Cosmina varia* Wlk.

*Head* : ♂ frons rather wide, ♀ frons one-third of head width, the eyes sharply diverging from the vertex. Frontal stripe dark yellow, parafrons and face pale yellow, parafacialia not distinguished. Genae and occiput concolorous. Antennae and palpi slightly darker yellow. *Thorax* pale metallic green, with a varying amount of pale yellowish pile, sometimes appearing greyish bronze. No pilose pleural stripe. *Abdomen* brownish-yellow, darkened apically. *Legs* : front femora metallic green, posterior pairs black. Tibiae brown and tarsi black. *Wings* brownish-infuscated along costa. Long 7-8 mm.

Apparently a coastal species, known from the East Coast of India and from Ceylon at sea-level.

### **Trichometallea** Townsend.

Epistome forward produced. No facial carina. Male sub-holoptic. Arista bare. Mesoscutum, scutellum and abdomen pilose in male, but not in female. Anal segment with discals. Apical cell widely open. The male sternites in this genus are uncovered, but I think it is correctly located here.

### **Trichometallea pollinosa** Townsend.

For description see Townsend 1917, page 194. India, Ceylon and China.

### **Rhynchomyia** Robineau-Desvoidy.

Epistome forward produced. No facial carina. Arista microscopically pubescent. Apical cell narrowly open. Male sub-holoptic. No differentiated proclinate fronto-orbitals in female.

I have no hesitation in sinking Townsend's *Rhynchomyiopsis* here. The separatory characters are very weak.

### **Rhynchomyia indica** Townsend.

For description see Townsend 1917, page 195.

Only known from Karachi, the species probably belongs to the Ethiopian fauna, and may prove to be synonymous with some African species.

### **Metalliopsis** Townsend.

Epistome forward produced. Facial carina weak, flattened. Arista short plumose on basal two-thirds. Male sub-holoptic. Female frons rapidly widening from vertex, parafrontalia thickly bristled outside of frontal row. Parafacialia hairy above. Irregular discals on anal segment. Apical cell widely open.

### **Metalliopsis setosa** Townsend.

For description see Townsend 1917, page 198.

Known from the Eastern Himalaya and Malaya.

**Metallea** van der Wulp.

Epistome forward produced, but only slightly. Facial carina flat and weak. Arista finely pubescent. Male sub-holoptic. A marginal row of macrochaetae on last three abdominal segments. Apical cell well open. As the structure of the ♂ genitalia shows (Plate i, figs. 6, 9, 10), the genus is apparently related to *Cosmina*.

KEY TO THE ORIENTAL SPECIES OF *METALLEA*.

|  |                        |
|--|------------------------|
| 1. Femora all black ..   | 2                      |
| Femora with basal half yellow-brown                            | <i>flavibasis</i> S.-W |
| 2. Abdomen towards apex with metallic green lateral patches .. | <i>notata</i> Wulp.    |
| No such patches  | <i>divisa</i> Wlk.     |

**Metallea flavibasis** Senior-White.

For description see Senior-White 1922, page 168.

Known from the Gangetic Plain and Ceylon.

**Metallea divisa** Walker.

*Metallea nigrofemorata* S.W. *Rhynchomyia palliceps* Big.

Plate V, figs. 6, 9, 10.

For description see Senior-White 1923, page 46 (as *nigrofemorata*).

Recorded from the Himalaya, the Gangetic Plain, and Australia.

**Metallea notata** van der Wulp.

The following is a translation of Wulp's very full description.

*Head* pale yellow ochre, frontal band orange, very narrow, terminating in a shining spot above the antennae, the middle of the face and the mouth edge very shining. Antennae and palpi orange, the latter pale but brown at the extreme tip. Epistomal hairs whitish yellow. *Thorax* and scutellum a beautiful metallic green, yellowish grey dusted, laterally ashy, but not entirely obscuring the ground colour, the chaetae arising from small black papules. *Abdomen* a transparent yellow on the first three segments, the third ring with a posterior band of metallic green covering almost half its length. Further, on the second and third, and, more or less, on the last segment, dark brown dorsal patches fleck-like, and on the second segment a pair of similar side patches placed bar-wise, the whole more or less visible on the ventral side. Fourth segment is altogether opaque, partly metallic green, with a sprinkling of yellow dust and black hair-papules. *Legs*: femora black, the fore pair with metallic green reflections; tibiae brownish yellow with black tips; tarsi dark brown, lighter basally. *Wings* almost clear, with a somewhat yellow tint basally. Long 7 mm.

India, general but rare. Java. China. ? South Africa.

**Borbororhinia** Townsend.

Epistome produced downward, facial carina weak. Arista thinly bipilose. Male eyes widely separated. Thorax and abdomen finely

pubescent, the former without macrochaetae, the latter with fine hair-like marginals. Male genitalia somewhat prominent. Apical cell narrowly open.

### **Borbororhinia bivittata** Walker.

*Borbororhinia pubescens* Tnsd.

Plate V, figs. 5, 7, 8.

For description see Townsend 1917, page 188 (as *pubescens*).

Known from Borneo, Buru Island, Assam, South India and Ceylon.

### **Cosmina** Robineau-Desvoidy.

Epistome produced downwards, not very strongly. Facial carina weak. Arista biplumose, tip more or less bare. Male eyes nearly contiguous. Male hypopygium large. Macrochaetae on anal segment weak, practically only marginal. Apical cell open.

I do not think that there is more than one Oriental species in this genus, of which the oldest name is that of Walker.

### **Cosmina aenea** Walker.

*Cosmina micans* Big. *Phumosia fulvicornis* Big. *Cosmina indica* S.-W. *Idia basifera* Walk. ms.

For description see Senior-White 1923, page 42 (as *indica*).

Recorded from West Africa, India, Java and Borneo.

### **Synamphoneura** Bigot.

Epistome produced forward, broad. Facial carina absent. Arista biplumose. Male eyes nearly contiguous, frontalia pinched out. Male hypopygium rather large. Strong marginal macrochaetae on anal segment. Apical cell varying from narrowly open to closed and petiolate.

### **Synamphoneura bicolor** Walker.

*Synamphoneura cuprina* Big. *Cosmina pinangiana* Big.

*Head* : ♂ sub-holoptic, ♀ frons nearly one-third of head width. Frontal stripe pinched out in ♂, in ♀ chestnut brown. Parafrontalia ashy with shining black spots. Parafacialia silvery white, with two shining black patches. Face shining black, separated from the similar genae by a yellowish stripe which seems silvery in certain lights. Antennae yellow-brown. Palpi apically spatulate black, paler at extreme tips. *Thorax* shining coppery green, with whitish pollen and black spots, with four darker, non-pollinose stripes. *Abdomen* concolorous, with a dark median stripe. *Legs* : femora metallic green, tibiae brownish, tarsi brown on the basal, black on the apical segments. *Wings* : costa deeply infuscated up to second vein, and broadly but less deeply over apex to bend of fourth vein. Apical cell open or closed petiolate in varying degrees, not always constant in opposite wings of same specimen. Long 6-8 mm.

**Idiella** Brauer & von Bergenstamm.

Epistome produced forwards. Facial carina well developed, sharp. Arista long ciliate above only. Male eyes well separated, the frontalia broadly present throughout. Apical cell closed or narrowly open. Male hypopygium usually prominent.

KEY TO THE ORIENTAL SPECIES OF *IDIELLA*.

|   |                            |
|---|----------------------------|
| Large species (8 mm.), base of abdomen usually bright yellow. Costa yellowish | <i>mandarina</i> Wd.       |
| Small species (5 mm.), base of abdomen dark brown. Costa dark brownish        | <i>euidielloides</i> S.-W. |

**Idiella mandarina** Wiedemann.

*Idia bengalensis* R.-D. *Stomorhina bivittata* Big. *Idia nigricauda* Big.

## Plate VI, figs. 1—3.

**Head**: ♂ broadly sub-holoptic, ♀ frons one-fifth of head width. Frontal stripe dark brown to black, parafrontalia white with shining black spots. Face shining black, parafacialia white with shining black spots, a very large one just before lower margin. Genae shining black, separated from face by a brownish spot above, but not so from epistome. Antennae brown. Palpi black. Occiput on lower half thickly golden haired. **Thorax** green, thickly greyish-white dusted, so as to nearly obscure the ground colour, with black spots. In certain lights three obscure darker stripes are visible. Pleurae throughout thickly golden haired. **Abdomen**, two basal segments normally orange, sometimes darkened. Apical segments blackened, the tip of abdomen shining blackish-green. **Legs**: femora black, tibiae and first tarsal joint brownish, rest of tarsi black. **Wings** yellow basally, a small apical infuscation. Long 8 mm

The widely spread superior claspers are quite unlike a Rhiniine, and amply justify the separation of the genus from *Stomorhina* and the allied genera erected by Townsend.

Widely distributed in the Oriental Region.

**Idiella euidielloides** Senior-White.

For description see Senior-White 1922, page 166.

Known from Assam, and the Philippines. I have also taken a specimen in Ceylon, Nalanda, 17-1-23.

**Stomorhina** Rondani.

♂ Holoptic or nearly so. Facial carina present. Arista ciliate above only; in one aberrant species biplumose. Abdominal macrochaetae from none to marginal on last two segments. Apical cell varying from fairly widely open to closed petiolate. In this genus I would sink *Euidiella* and *Idielliopsis* Townsend. The figures of genitalia in the various Townsend groups show an essential similarity of construction.

KEY TO THE ORIENTAL SPECIES OF *STOMORHINA*.

|  |  |
|--|--|
| 1. Apical cell open .. ..  | 2  |
| Apical cell closed, in line with final course of vein IV         | <i>xanthogaster</i> Wd.                        |
| 2. Antennae ciliate only above .. ..                             | 3  |
| Antennae with arista biplumose .. ..                             | <i>bipilosa</i> S.-W.                          |
| 3. Apical cell quite widely open ..                              | 4  |
| Apical cell narrowly open ..                                     | 5  |
| 4. Abdomen yellow, black banded                                  | <i>lunata</i> Fab.                             |
| Abdomen green ..   | <i>unicolor</i> Macq.                          |
| 5. Femora always black (base of hind pair sometimes paler) ..    | 6  |
| Femora pale brownish-yellow ..                                   | <i>luteigaster</i> Meij.                       |
| 6. Front tibiae pale, at least basally ..                        | 7  |
| Front tibiae all black ..  | 10   |
| 7. Abdomen all dark, without traces of yellow markings ..        | 8  |
| Abdomen with some yellow markings ..                             | 9  |
| 8. Large species, thorax green, abdomen purple                   | <i>melanostoma</i> Wd.                         |
| Small species, abdomen dark green                                | <i>simplex</i> Wlk.                            |
| 9. Abdomen luteous, with dark median stripe of varying extent .. | <i>discolor</i> Fab.                           |
| Abdomen black, with brown spots on second and third segments ..  | <i>quadrinotata</i> Big.                       |
| 10. Genae and pleural stripe yellow                              | <i>discolor</i> Fab. ab. <i>nigripes</i> S.-W. |
| Genae and pleural stripe grey .. ..                              | <i>nila</i> S.-W.                              |

***Stomorhina lunata* Fabricius.**

*Idia cinerea* R.-D. *Idia fasciata* Meig. ? *Idia rostrata* Wd. *Stomorhina maculata* Rond.

Plate VI, figs. 7—9.

*Head* : ♂ holoptic, parafacilia silvery, with a large shining black spot. Face shining black, epistome brown. Occiput and genae pale ashy, with long concolorous hairs. *Thorax* pale bluish-grey, with three dark greenish-grey stripes. In the ♂ covered with thick short upright black pile, not so in ♀. Pleurae thickly pale whitish-yellow haired. *Abdomen* : first segment all black, second and third bright yellow with a broad median stripe and narrower hind margins black, fourth black with patches of grey shimmer as in a *Musca*. *Legs* : femora and tibiae brown, appearing greyish in certain lights, tarsi darkened. *Wings* clear. Vein IV very obtusely angled at bend leaving apical cell fairly widely open. Long 7 mm.

Occurs throughout the Palearctic and Ethiopian Regions. In the Oriental Region only found in Baluchistan and the Himalaya, which of course have strong Palearctic affinities. Townsend (1917) records it from the Nilgiris, but this record has not since been confirmed.

***Stomorhina discolor* Fabricius.**

*Idia cincta* Big. *Stomorhina muscina* Rond. *Idia metallica* Macq.

Plate V, figs. 11—13.

*Head* : ♂ sub-holoptic, ♀ frons nearly one-third of head width. Frontal stripe dark brown, parafacilia whitish, with shining black

spots. Parafacalia similar. Face, epistome and anterior half of genae shining black. Posterior half of genae and occiput yellowish white with concolorous hairs. Antennae brown, thickly grey dusted. Palpi brown. *Thorax* ground colour green, thickly grey dusted, covered with small black spots. Pleurae with golden (or whitish) yellow pile forming a stripe. *Abdomen* luteous, the segments with black hind margins, and with a median black stripe of varying width and extent, which sometimes is so extensive as to quite alter the superficial appearance of the specimen. *Legs* : front coxae yellow, posterior pairs black. Anterior femora all black, hind pair with basal third brownish-yellow. Tibiae brownish-yellow, front and hind pairs darkened apically. Tarsi brownish-yellow, apical segments black. *Wings* with apical cell narrowly open. Apex more or less infuscated, never extensively. Long 6-7 mm.

*ab. nigripes* S.-W I described this (Senior-White 1922), as a variety, but as I have never come across another specimen, I think that it is little more than an individual aberration.

Perhaps the commonest Oriental species of the sub-family. Known from India to Hong Kong, Fiji, New Caledonia and North Australia.

### **Stomorhina quadrinotata** Bigot.

*Head* : ♂ sub-holoptic, ♀ frons nearly one-third of head width. Frontal stripe black, parafrontals dark grey with black spots, parafacials similar. Face grey beneath antennae. Genae and epistome shining black. Occiput ashy grey. Antennae and palpi black. *Thorax* very dark green, with greyish white pile and numerous small black spots. A median and two sub-dorsal black stripes are visible. Pleurae with ashy-grey, not thickly piled, stripe. *Abdomen* dark brownish-black, with a pair of light ochreous side spots on dorsum always present on second, sometimes on first, and sometimes on third segment. In the ♂ from the Philippines, referred to in Senior-White 1924b, the whole of the first segment is yellow, except for a narrow apical band, as is also the second segment, except for the apical and a narrow median stripe, and the spots on the thira are also large. *Legs* : femora black, tibiae and first two tarsal segments brown, apical tarsal segments black. *Wings* clear, apparently never with an apical infuscation. Apical cell narrowly open. Long  $5\frac{1}{2}$  mm.

The distribution of this species extends from the Darjiling Himalaya, through Assam, to Borneo, the Philippines and China. I have previously recorded it from Buru Island (Dutch East Indies), which is in the Austro-Malayan Sub-Region.

### **Stomorhina simplex** Walker.

*Idiella cyanea* Stein. *Euidiella unicolor* Tnsd. (*nec Macq.*).

For description see Townsend 1917, page 193 (as *unicolor*). As I have pointed out (Senior-White 1923), there may be an apical infuscation of the wing of which Townsend omits to make mention,

Recorded from India, Sumatra, Borneo and the Seychelles.

**Stomorhina melanostoma** Wiedemann.*Euidiella purpurea* Tnsd.

Plate V, figs. 15, 16.

For description see Townsend 1917, page 193 (as *purpurea*)  
 Recorded from India, Java, Malaya and Buru Island.

**Stomorhina nila** Senior-White.

For description see Senior-White 1922, page 168. There may be brownish dorso-lateral abdominal patches, much as in *quadrinotata*, but darker. Apparently confined to the various Hill ranges of Peninsular India.

**Stomorhina unicolor** Macquart.

*Head* : frons black, parafrontals grey. Face dark shining green. Antennae and palpi black. Genae ashy. *Thorax* green, without a distinct lateral stripe across pleurae. *Abdomen* dark green. *Legs* dark brownish. *Wings*, the apical cell more widely open, as in *lunata*.

Described from Java ; the species does not seem to have come to hand since, and fresh specimens are required for an adequate description.

**Stomorhina luteigaster** de Meijère.*Euigiella termitophila* S.-W.

For description see Senior-White 1923, page 45 (as *termitophila*).  
 Recorded from Java and Upper Burma.

**Stomorhina xanthogaster** Wiedemann.*Idia australis* Wlk. *Idielliopsis similis* Tnsd.

Plate VI, figs. 4—6.

For description see Townsend 1917, page 190 (as *similis*).

From India through Malaysia to Australia. Kertesz (1907) records it from Arabia.

**Stomorhina biplumosa** Senior-White.

For description see Senior-White 1924b, page 110.

Recorded from Siam and Malaya.

**Chlororhinia** Townsend.

Male sub-holooptic. Facial carina present but weak. Arista merely pubescent, on upper side only. Male hypopygium large. Apical cell petiolate, in line with third vein.

**Chlororhinia viridis** Townsend.

For description see Townsend 1917, page 191. The fact that the pilose stripe from the genae across the pleurae, which is usual in this section of the Rhiniinae, is wanting in this species is noted in the generic and not in the specific description. Should another species be

found, corresponding with the generic definition except in this particular, the presence of the pilose stripe would not invalidate its inclusion in this genus. The present species is only known from the Assam Hills.

### Rhinia Robineau-Desvoidy.

*Beccarimyia* Rondani.

Male sub-holoptic. Facial carina broad. Arista ciliate above only. No abdominal macrochaetae. Apical cell petiolate, in line with third vein.

### Rhinia testacea Robineau-Desvoidy.

*Idia flavipennis* Macq. *Rhinia fulvipes* Big. *Idia tripartita* Big. *Beccarimyia glossina* Rond.

*Head* : ♂ sub-holoptic, ♀ frons one-fifth of head width. Frontal stripe black, parafrontalia white with closely set shining black spots. Parafacials similar. Face, epistome and genae shining black. Occiput black above, covered with bright golden pile below. Antennae and palpi brown. *Thorax* dark green, so thickly covered with black spots as to appear, with the thin white pile with which it is covered, dark grey. Traces of a median and two sub-dorsal black stripes sometimes apparent. Pleurae with stripe of thick golden pile. Abdomen orange, sometimes infuscated at tip. *Legs*, except tips of tarsi, blackened, all brownish-yellow. *Wings* clear, with or without a small apical infuscation. Long 6 mm.

Throughout the Oriental Region, and extending to the Pacific Islands. If the Ethiopian *R. apicalis* Wd. is conspecific, as Villeneuve (1921) believes, then the species also occurs throughout a large part of Africa. I have seen specimens from the Chagos Islands, but whether these belong to the Oriental or the Ethiopian Region has never been declared.

### REFERENCES.

- 1907 KERTÈSZ, Catalogue of the Palearctic Diptera, vol. III.
- 1924. PATTON & SENIOR-WHITE, The Oriental species of the genus *Musca* Linn. *Rec. Ind. Mus.* XXVI, p. 553.
- 1922. SENIOR-WHITE, New species of Diptera from the Indian Region. *Mem. Dept. Agric. Ind. (Ent. ser.)*, VII, p. 107
- 1923. SENIOR-WHITE, Notes on Indian Muscidae-Rhiniinae. *Mem. Dept. Agric. Ind. (Ent. ser.)*, VIII, p. 40.
- 1924a. SENIOR-WHITE, A Revision of the sub-family Sarcophaginae in the Oriental Region. *Rec. Ind. Mus.* XXVI, p. 193.
- 1924b. SENIOR-WHITE, New and little known Oriental Tachinidae. *Spol. Zeyl.* XIII, p. 103.
- 1917 TOWNSEND, Indian Flies of the sub-family Rhiniinae. *Rec. Ind. Mus.* XIII, p. 185.
- 1921. VILLENEUVE, Six New African Tachinids. *Trans. Ent. Soc. London*, 1921, p. 518.